IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

Ex Parte:	DOLBEAR, CATHERINE MARY
Application Number:	10/070,069
Filing Date:	March 4, 2002
Title:	Method and Apparatus for Video Encoding
Group:	2621
Examiner:	ANAND SHASHIKANT RAO

APPEAL BRIEF ON BEHALF OF APPELLANTS UNDER 37 CFR 41.37

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I. REAL PARTY IN INTEREST

The name of the real party in interest for purposes of this appeal is Motorola, Inc., a Delaware corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to the Applicant, the Applicant's legal representative, or assignee which would directly affect or be directly affected by or having a bearing on the Board's decision in this pending appeal.

III. STATUS OF CLAIMS

Claim 4 is cancelled. Claims 1-3 and 5-11 remain in the application. Claims 1-3 and 5-11 are being appealed. Claims 1-3 and 5-11 stand or fall together.

In a final Office Action dated March 15, 2007: Claims 1-3 and 5-11 were rejected under 35 U.S.C. 102(e) as being anticipated by Wan, et al. (USPN 6,580,754).

IV. STATUS OF AMENDMENTS

No amendments to the claims have been made subsequent to the Final Office Action mailed March 15, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Although specification citations are inserted below in accordance with 37 C.F.R. § 41.37, these reference numerals and citations are merely examples of where support may be found in the specification for the terms used in this section of the brief. There is no intention to in any way suggest that the terms of the claims are limited to the examples in the specification. Although, as demonstrated by the reference numerals and citations below, the claims are fully supported by the specification as required by law, it is improper under the law to read limitations from the specification into the claims. Pointing out specification support for the claim terminology, as is done here to comply with rule 41.37, does not in any way limit the scope of the claims to those examples from which they find support. Nor does this exercise provide a mechanism for circumventing the law precluding reading limitations into the claims from the specification. In short, the reference numerals and specification citations are not to be construed as claim limitations or in any way used to limit the scope of the claims.

The invention, as defined in independent Claim 1 and with reference to FIGs. 8 & 9, is a method of enhancing a video bit stream using temporal scalability, wherein peak signal-to-noise ratios of bidirectionally predicted pictures in an enhancement layer are determined with reference to the peak signal-to-noise ratios of pictures in another layer. (Specification page 5, line 26 to page 6, line 31).

The invention, as defined in independent Claim 2 and with reference to FIGs. 8 & 9, is a method of enhancing a video bit stream using temporal scalability, wherein the number of bits allocated to encode a bidirectionally predicted picture of an enhancement layer is determined

with reference to the number of bits used to encode a picture of another layer. (Specification page 5, line 26 to page 6, line 31).

The invention, as defined in independent Claim 3 and with reference to FIGs. 8 & 9, is a method of enhancing a video bit stream using temporal scalability, wherein temporal positions of bidirectionally predicted pictures in an enhancement layer are determined to be spaced evenly with reference to temporal positions of pictures in other layers. (Specification page 5, line 26 to page 6, line 31).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether Claims 1-3 and 5-11 are patentable under 35 U.S.C. 102(e) over Wan, et al.?

VII. ARGUMENT

A. Claims 1-3 and 5-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Wan, et al. (USPN 6,580,754).

MPEP § 2131 provides: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Applicant respectfully submits that Wan does not anticipate, either expressly or inherently, each and every element as set forth in independent claims 1, 2, and 3. Specifically, each of the independent Claims 1, 2 and 3 are directed to a "method of enhancing a video bit stream using temporal scalability", which is not anticipated either expressly or inherently in the Wan reference. Regarding temporal scalability, as explicitly stated in Wan, this reference does little more than give a "brief review of temporal . . . scalability in MPEG-4" (col. 5, lines 22-23). This brief review is predicted to be provided at col. 4, lines 7-8 and actually given at col. 5, lines 25-40 by reference to FIG. 2 and does no more than: identify a benefit of an "increase in the temporal resolution by using one or more enhancement layers in addition to the base layer" (col. 5, lines 25-27); give an example by reference to FIG. 2 of "temporal scalable coding with two layers", i.e., one base layer and one enhancement layer, with the enhancement layer comprising some bidirectionally predicted or "B" pictures (col. 5, lines 29-30); define how "Basic video is obtained by decoding only the independent base layer" (col. 5, lines 30-32); describe a general benefit of using an enhancement layer to "provide[] video with, e.g., seven times the temporal

resolution of basic video" (col. 5, lines 32-36); and define in general how B-pictures or frames are encoded, wherein a "frame in the enhancement layer 250 can use motion compensated prediction from the previous or next frame in display order belonging to the base layer" (col. 5, lines 36-39) – compare this to the definition of a B-picture in the present specification at page 3, line 5 that a "B-picture is predicted based on pictures from the layer below it".

Other than this "brief review" of temporal scalabilty, Wan provides no additional teachings regarding any particular "method of enhancing a video bit stream using temporal scalability" and, thereby, provides no teachings regarding any of the other limitations in Claims 1-3 that recite such methods. Instead, Wan is clearly directed to methods with respect to spatial scalability coding and simulcast coding. For instance, in the abstract alone Wan explicitly states "An optimal system for determining whether simulcast coding (400) or spatial scalability coding (100) should be used to encode video . . . Operating points (A', B', C') for both simulcast coding and spatial scalability are also determined. . . A system for determining the point (A', C') of equal quality in both layers of simulcast and spatial scalability coding is also provided. The proportion of bits allocated to the base layer to achieve equal quality is essentially independent of the total bit rate for both simulcast and spatial scalability." A myriad of other examples can be found in the reference including, but not limited to, at col. 1, lines 65-67 ("An optimal technique is provided for selecting between spatial scalability and simulcast coding to provide an efficient compression algorithm"; at col. 4, lines 3-5 ("The present invention provides techniques for selecting between simulcast coding an spatial scalability for multicast services, such as multicast video"); and at col. 6, lines 27-28 ("This invention focuses on the performance of spatial scalability and its simulcast counterpart"). Thus, Applicants submit that other than the "brief review" of temporal scalability provided in col. 5, the remainder of the Wan patent

describes techniques for selecting between spatial coding and simulcast coding, in contrast to the limitations recited in Claims 1-3.

We now turn attention to the additional recitations in the independent claims. First regarding Claim 1, this claim further recites "peak signal-to-noise ratios of bidirectionally predicted pictures in an enhancement layer are determined with reference to the peak signal-to-noise ratios of pictures in another layer", which is not anticipated either expressly or inherently in Wan. Let's look at the citations in the Office Action dated March 15, 2007 at page 3, to support the contention that these limitations are anticipated by Wan. The Office Action cites col. 5, lines 35-40 and FIG. 2. As mentioned above, FIG. 2 only illustrates the two layers (i.e., a one base layer and one enhancement layer) for temporal scalable coding, and col. 5, lines 35-40 does nothing more than define a B-picture in general. There is no discussion regarding the peak signal-to-noise ratio (PSNR) of the B-pictures in the enhancement layer and how this PSNR is determined.

The Office Action dated March 15, 2007 further cites col. 9, lines 5-12. However, lines 5-12 have nothing to do with determining the PSNR of B-pictures in the enhancement layer for temporal scalability as required by Claim 1, but instead describes computing PSNR of the base and enhancement layers in simulcast coding (see the heading of this section at col. 7, line 52). In fact, Wan describes simulcast coding in the passage from col. 5, line 54 to col. 10, line 21. Within this passage, Wan clearly distinguishes simulcast coding from scalable coding at col. 6, lines 1-10 – stating "for simulcast coding, the streams are independent, whereas scalable coding usually refers to an independent base layer with one or more dependently coded enhancement layers…." Therefore, since B-pictures in an enhancement layer are predicted from previous and next frames/pictures in a lower layer, as defined in both col. 5, lines 35-40 of Wan and page 2,

line 30 to page 3, line 10 (background section) of applicant's specification whereas simulcast coding requires the two streams to be independent (see col. 6, lines 1-6), the simulcast coding technique does not involve coding of B- pictures.

The citations from the Office Action dated November 1, 2006 fare no better. This Office Action at page 3 additionally cites col. 11, lines 50-60 and col. 7, lines 50-60 to reject Claim 1 as being anticipated by Wan. Col. 7, lines 50-60 discuss simulcast coding, which as discussed previously does not involve the encoding of B-pictures in the enhancement layer and therefore does not anticipate determining "the peak signal-to-noise-ratio of bidirectionally predicted pictures in an enhancement layer" using temporal scalability as required by Claim 1. Col. 11, lines 50-60 merely shows "the simulcast and spatial scalability results for each test sequence" illustrated in figures 15-20, which again have nothing to do with determining "the peak signal-to-noise-ratio of bidirectionally predicted pictures in an enhancement layer" using temporal scalability as required by Claim 1.

Regarding independent Claim 2, this claim further recites "the number of bits allocated to encode a bidirectionally predicted picture of an enhancement layer is determined with reference to the number of bits used to encode a picture of another layer", which is not anticipated either expressly or inherently, in Wan. The Office Action dated March 15, 2007 claims at page 3 that Wan at col. 7, lines 1-20, Table I, entry QB and M and N relates to determining the number of B frame bits in temporal scalability. Applicants disagree, especially since Wan explicitly states otherwise at col. 6, lines 51-54. More particularly, the reference instead states with regard to Table 1 that "An MPEG-4 encoder was used to encode the simulcast and spatial scalable streams at various fixed quantization levels with no rate control. The parameters used for the simulations are shown in Table 1". Again, this citation deals not with determining "the number of bits

allocated to encode a bidirectionally predicted picture of an enhancement layer" using temporal scalability as recited in Claim 2, but to simulcast coding and spatial scalable coding. In addition, the Office Action dated November 1, 2006 at page 3 further cites Col. 8, lines 60-67 and col. 9, lines 1-30, but based on Applicant's above argument, these citations are directed to simulcast coding, which does not even use bidirectionally predicted pictures in an enhancement layer as required by Claim 2. Further cited in this Office Action (dated 11/1/06) is Wan col. 10, lines 25-35, which mentions "base layer bit rate . . . with different enhancement layer bit rates" for "spatial scalable coding" (*see* col. 10, line 22) but says nothing of how the "number of bits allocated to encode a bidirectionally predicted picture of an enhancement layer is determined" using temporal scalability as recited in Claim 2.

Regarding independent claim 3, this claim further recites "temporal positions of bidirectionally predicted pictures in an enhancement layer are determined to be spaced evenly with reference to temporal positions of pictures in other layers", which is not anticipated either expressly or inherently, in Wan. The only citations from Wan upon which the rejection of Claim 3 is based was given in the Office Action dated November 1, 2006 at page 3, which are col. 4, lines 5-10 and 50-60 and col. 5, lines 35-40. To the contrary of what is argued in this Office Action, the citations at col. 4, lines 4-10 merely state with regards to temporal scalability that a "brief review of general scalable coding (temporal scalability in addition to spatial scalability) is first provided", and col. 4, lines 50-60 simply describe the "general concept of scalability [as] illustrated in FIG. 1 for a codec with two layers". Further to this, the reference at col. 4, lines 54-58 describe in general the coding of the base and enhancement layers, stating "Note that coding and decoding of the base layer operates exactly as in the non-scalable, single layer case. In addition to the input enhanced video, the enhancement layer encoder uses information about the

base layer provided by the microprocessor to efficiently code the enhancement layer". What is absent however are any specifics of this "information about the base layer" that is used by the enhancement layer encoder. As noted above, col. 5, lines 35-40 give a "brief review" of temporal scalability and a general definition of B-pictures. However, neither of these citations from Wan disclose the determining of "temporal positions of bidirectionally predicted pictures in an enhancement layer" using temporal scalability and that these B-pictures are to be "spaced evenly with reference to temporal positions of pictures in other layers" as recited in Claim 3.

Additionally, Applicant respectfully disagrees with the statement on page 3 of the Office action dated March 15, 2007 that "[w]ith regards to temporal scalability, it is noted that the TS factor would be modified in accordance with the rates (1-3) which refers both the number of bits used and the PSNR of the base layer (Wan: column 9, lines 5-12)." The cited passage in contrast discloses an example of a bisection algorithm to find a point of equal quality in Simulcast coding. See Wan, col. 8 lines 55-60. Also, Applicant fails to find the relevance of the term "TS factor" with the claimed inventions or even the location of this term in the Wan reference.

Therefore since limitations are missing from the Wan, et al. reference, Applicant respectfully submits that the rejections of Claims 1, 2 and 3 are improper and requests withdrawal of the rejections of Claims 1, 2 and 3 under 35 U.S.C 102(e). Dependent Claims 5-11 depend from, and include all the limitations of independent Claim 1, including those limitations that were shown above not to be disclosed in Wan, et al. Accordingly, Applicant likewise respectfully requests the withdrawal of the rejection of Claims 5-11 under 35 U.S.C. 102(e) for the same reasons above with respect to Claim 1.

For the reasons set forth above, Applicant submits that Claims 1-3 and 5-11 are incorrectly rejected under 35 U.S.C. § 102(e) and requests that the Board withdraw the rejections.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (original) A method of enhancing a video bit stream using temporal scalability, wherein peak signal-to-noise ratios of bidirectionally predicted pictures in an enhancement layer are determined with reference to the peak signal-to-noise ratios of pictures in another layer.

2. (original) A method of enhancing a video bit stream using temporal scalability, wherein the number of bits allocated to encode a bidirectionally predicted picture of an enhancement layer is determined with reference to the number of bits used to encode a picture of another layer.

3. (previously presented) A method of enhancing a video bit stream using temporal scalability, wherein temporal positions of bidirectionally predicted pictures in an enhancement layer are determined to be spaced evenly with reference to temporal positions of pictures in other layers.

4. (cancelled)

5. (previously presented) A method as claimed in claim 1, wherein the peak signal-to-noise ratios are made similar.

6. (previously presented) A method as claimed claim 1, wherein the other layer is a base layer.

7. (previously presented) A method as claimed in claim 1, wherein characteristics of more than one picture in another layer are considered.

8. (previously presented) A method as claimed in claim 1, wherein:

(i) a first enhancement layer uses SNR scalability to produce enhanced pictures; and

(ii) a second enhancement layer uses temporal scalability to produce enhanced pictures, based on temporal positions of pictures in the first lower enhancement layer.

9. (previously presented) A method as claimed in claim 1, wherein an average number of bits used to define a predicted picture and an average number of bits used to define a picture in the another layer are used to define a weighting value.

10. (previously presented) An apparatus which implements a method according to-claim 1, the apparatus including:

means for selecting temporal position, PSNR and/or number of bits of a bidirectionally predicted picture based on information relating to a picture in another layer.

11. (original) An apparatus as claimed in claim 10, which is adapted to encode video signal for transmission via a mobile communications system.

IX. EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132, entered by the examiner and relied upon by the appellant in the appeal, or relied upon by the examiner as to grounds of rejection to be reviewed on appeal.

X. RELATED PROCEEDINGS APPENDIX

No decisions have been rendered by a court of the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 C.F.R. § 41.37.